Before the
Federal Communications Commission
Washington, D.C. 20554

In the matter of

Amendment of Part 97 of the Commission's Rules To Implement WRC-03 Regulations Applicable to Requirements for Operator Licenses in the Amateur Radio Service	)))))	WT Docket No. 05-235

Comments filed by Gordon R. Smith, licensee of amateur station K7HFV

The Commission has proposed to eliminate all testing of amateur radio operators for their ability to receive the International Morse Code. I believe such an action would be detrimental to effective use of our HF frequency spectrum, flexibility in finding ways to communicate during emergencies, and the goal of advancing operator skills set forth in the "Basis and Purpose" section of the Commission's rules governing the amateur service. I am not opposed to offering some high frequency privileges to those who have not passed a code test, but I believe it would be detrimental to remove all incentive for amateurs to learn the International Morse Code.

I hope to show that:

1. Elimination of the code requirement would, over time, drastically reduce the number of Morse Code (CW) operators on the high frequency (HF) bands.
2. A reduction in the number of CW operators would result in a larger percentage of users using wider-bandwidth modes and less efficient use of the spectrum.
3. A reduction in the number of CW operators would remove what has been, in the past, an important tool for long-distance emergency communications.

It is important to note that the NPRM would affect only the high-frequency portion of the amateur radio frequency allocations. The vast majority of available frequencies and modes – all privileges above 30 MHz – are already available to Technician Class operators, who are not required to pass a code examination. Their privileges include all legal emission types and hundreds of Megahertz of spectrum, including the ability to operate through satellites, operate repeaters, make long-distance contacts via internet-connected

repeaters and take advantage of propagation modes such as moonbounce, meteor scatter, tropospheric ducting and aurora. The Commission suggests in the NPRM that elimination of the code requirement would make it possible for more people to become licensed. It is my experience that it is very rare to find a prospective licensee who avoids amateur radio entirely because of the code requirement for the small portion of the amateur spectrum that falls in HF.

Most CW Operators Learned the Code Because of the Licensing Requirement

The main effect of the proposed rules would be on HF telegraphy by on-off keying, the mode known almost universally as CW. As some petitioners have pointed out, CW is not the most popular HF mode, but, as FISTS pointed out, it is clearly the *second* most popular mode, the first being voice communication using single sideband. Despite claims by some of CW's obsolescence, the mode is used every day by thousands of operators. They find it enjoyable for various reasons including its effectiveness under poor conditions, its modest bandwidth requirements, its effectiveness using low power, and the ability to use it with very simple and light equipment that can be carried in a backpack.

However, most current CW operators, myself included, would never have discovered or used the mode had they not been required to learn the code as a licensing requirement. As I have asked the question to numerous operators, I have only found one who said he had actually looked forward to learning the code and would probably have done so regardless of licensing requirements. The rest of us simply discovered how valuable the mode is after we had learned the code in order to obtain our licenses. I'm sure many of us are also thankful our parents and teachers pushed us to learn to read even though, as six-year-olds, we may not have been convinced it was an enterprise worthy of great effort.

CW is unlike other modes in that it takes weeks or months to develop proficiency to use it effectively. Yet its use gives the amateur service important benefits in the HF spectrum such as more effective spectrum utilization, ability to communicate with lower power, and ability to make long-distance communications with very portable equipment. For this reason it deserves continuing special treatment in the rules.

CW Operation Makes for Efficient Spectrum Use

Most CW signals occupy less than 100 Hz of bandwidth, depending on keying characteristics. Most operators can receive CW comfortably using a filter 250 Hz wide. So it is safe to say that 300 Hz is more than adequate bandwidth for a CW channel. A single sideband (SSB) voice signal occupies about three kilohertz. So a voice communication takes at least ten times the bandwidth of a CW communication (or QSO). Ten concurrent CW exchanges could take place in the same space as a single voice exchange! If new operators do not learn the code and, therefore, do not have the ability to use CW, the majority of them will be operating SSB voice. As the current CW operators are lost to attrition and replaced by operators unskilled in CW operation, the bandwidth requirements for amateur HF operation will expand drastically. Assuming

the total number of amateurs remains constant or increases, the HF allocations would not meet our needs as they currently do.

It has been pointed out that some of the digital modes now popular on HF have bandwidth efficiency comparable to or exceeding that of CW. The new modes have desirable features such as error correction and automatic adaptation to propagation conditions. We have had digital modes for a long time, going back to radioteletype in the 1950s. However, for whatever reason, the digital modes have never achieved more than a niche following among amateurs. I would dispute the Commission's assertion that "the trend in amateur communications is to use voice and digital technologies for exchanging messages," in so far as it applies to digital modes on HF. The number of regular CW users still exceeds the number of digital users. This may be due to more of a feeling of personal involvement in the case of CW, the need for a computer and lack of portability of the digital modes, or the inability of digital modes to separate signals in crowded band conditions or "pileups." But I see no reason to believe that removing the code requirement would increase the percentage of operators using digital modes. The biggest activity increase resulting from removing the code requirement would almost certainly be in voice activity.

The Commission, in the instant NPRM, suggests dropping the code requirement would "promote more efficient use of the radio spectrum currently allocated to the amateur radio service." It fails to explain how *lowering* the skill requirements for operators would *increase* the efficiency of spectrum use. In any scenario I can envision, exactly the opposite would be true.

CW Can Be a Vital Tool in Emergencies

The Amateur Radio Service has served the country well by providing emergency communications in numerous disaster situations. Most paid emergency responders including police, fire fighters, and Red Cross personnel, have radio systems of their own, many far more elaborate than amateur repeater systems in the same areas. But a major service that amateurs have often been able to provide is long-distance communication using the HF spectrum. HF communications have been available when other long-haul systems failed owing to the fact that HF radio circuits require no infrastructure. However, they do require considerable operator skill including the ability to copy through selective fading, noise, and interference, and knowledge of what frequencies would be suitable for communication over a certain distance at a certain time of day. Depending on ionospheric conditions, it is not uncommon for paths to be poor enough that CW works

and voice does not. These are cases where an operator's knowledge of the code can make a life or death difference.

I assisted an emergency net following the Hebgan earthquake near Yellowstone National Park. There was one mobile operator who happened to be in the disaster area at the time and was able to transmit requests for assistance. The net was on voice, but much of the time the mobile was not strong enough to be copied. Those of us in Utah could not hear him at all, but several stations in Idaho could copy his signal when he went to CW. So he sent his requests using CW and copied the replies on voice. I don't know if he had a key with him or if he was keying the transmitter using his push-to-talk switch, but it was a demonstration of a mode that is always available using any HF radio with a minimum of external equipment. Without the Idaho operators' knowledge of the code, some of the messages would not have gotten through.

One might say that that was a long time ago and the situation would be different today. But would it? The common voice mode (SSB) hasn't changed, the ionosphere doesn't work any better, and there were already receivers with noise figures below atmospheric noise. The chances are that the same situation could occur. Perhaps if it happened today the mobile operator could have used a digital mode, but that would have required him to have a computer with an audio-card interface along on his vacation, an unlikely scenario. CW is unique in its combination of weak signal effectiveness and simple equipment requirements.

The Commission, in the current NPRM and previous actions, has tended to downplay the value of CW in emergency communications. It may well be true that "most amateur radio operators who choose to provide emergency communication do so using voice or digital modes of communication, because information can be exchanged much faster using modes of communication other than telegraphy," but one does not always get to choose the mode based on speed. Remember that the code requirement affects only HF operation. The choice on HF is sometimes CW or nothing.

Additionally, it is not necessarily true that voice is faster than CW when the message must be written down and voice communications must take place at dictation speed. In practice, CW tends to win on accuracy and break even on speed. The handling of formal written traffic in the amateur service is done principally through the National Traffic System sponsored by the American Radio Relay League. Although voice and digital modes are utilized, the main backbone is implemented using CW, simply because it works better.

An amateur radio club of which I am a member has entered the national "Field Day" contest on a regular basis. This contest encourages amateurs to demonstrate their ability to set up equipment rapidly and provide communications from portable and mobile locations. Points are awarded for the most contacts made among participating stations. We have used voice, CW, and digital modes. For a number of years the club's CW operation has consistently made more successful contacts per hour than its stations at the same site using the other modes. This is true even though the amount of information that must be exchanged is the same on all modes. If information could be "exchanged much faster using modes of communication other than telegraphy," there was no evidence of it.

It might be of passing interest that in an experiment that was recently televised nationally, two amateur CW operators were able to pass a message more rapidly than two teenagers using text-messaging on their cell phones. My understanding is that this was not a fluke. The experiment was repeated several times before taping of the broadcast, always with the same results.

I remember that I followed ARRL bulletins (most easily copied on CW) during the communications emergency following the Mexican earthquake. ARRL at that time reported that the principal channel used for coordinating relief supplies was one on the 7 MHz band using CW. I think that if the Commission could find no evidence of CW use in emergencies (at least on HF) it didn't look very hard.

The Commission also remarked in a previous NPRM that emergency responders are not required to learn the code. Well, of course not! That is the very reason they often need to call on us for long-haul communications. Their radios and spectrum are chosen for short-haul communication where moderate signal strength is the rule. They are not called upon to do weak-signal narrow-band communications under rapidly changing ionospheric conditions. Their expertise and contributions are in areas other than communications. Comparing their operator requirements to ours would seem to be an "apples and oranges" comparison.

Miscellaneous Other Comments

Some petitioners and commenters have suggested that the code is obsolete because it has been dropped in other radio services. It must be remembered that the Amateur Radio Service is different from other services in several ways. In some cases, use of CW has been dropped by other services, not because it is no longer useful on HF, but because the services have abandoned HF altogether in favor of other types of communications. Satellites are an important component of most current commercial and

military schemes. There exist amateur satellites, but because of enormous launch expenses, the amateur service must rely on a certain amount of "charity" from organizations that provide launch opportunities. The affordable launches are rare and unpredictable. The result is that the available amateur satellites are orders of magnitude behind commercial and military satellite systems. Thus, HF remains an important long-distance medium for amateurs. (Satellite communication is already available to amateurs who have not passed a code examination.)

Amateur economics are also different from other services. In other services the cost of sophisticated equipment is often less than personnel costs. For example, it may well be cheaper for the Navy to use 10,000-watt transmitters to enable voice communications under bad conditions than to train operators in manual telegraphy. For amateurs the expense comparison is reversed. Use of such a high-power transmitter is neither affordable nor legal. However, telegraphy training is done on an individual basis at no cost.

The Commission states:

> Moreover, given that there is no requirement that a licensee who has passed a telegraphy examination actually use telegraphy for communications or otherwise maintain proficiency, successful completion of a one-time telegraphy examination offers no guarantee of future proficiency.

Certainly a code proficiency requirement makes no guarantee of what modes any particular operator may choose. However, if the most difficult part of learning to operate telegraphy is already past when an operator becomes licensed, the probability that he will try the mode and discover its advantages is dramatically increased. The presence of the code requirement in the past has unquestionably increased the percentage of operators using CW. There seems to be no reason to believe it would not continue to do so in the future, thereby increasing the number of simultaneous communications our HF spectrum allows.

The Commission states:

> We note that numerous commenters disagree, arguing that the requirement serves no purpose, is not essential to the safe and effective operation of an amateur station …

If the only criterion for including material in examinations were that it be "essential to the safe and effective operation of an amateur station" then most of the material in the Extra Class written examination would have to be

eliminated! Note that the Extra Class license conveys no new mode privileges over the General Class license, merely additional frequency privileges. If General Class operators are considered to be qualified to operate a particular mode safely on one frequency, then why would additional testing be required to operate the same mode on a different nearby frequency?

The answer, of course, lies in the Commission's program of incentive licensing which encourages amateurs to upgrade their technical and operating skills. Greater skill and understanding are rewarded with greater privileges. Learning to operate CW would appear to be one of the most productive upgrades extant.

Summary

Removing the code requirement for General class operators is a reasonable step. It seems to me that this would achieve most of the Commission's goals stated in the present NPRM. It would give those who do not learn the code an opportunity to experience all bands and modes available to amateurs. It would remove a potential barrier to those who would like to enter the hobby primarily to use HF.

However, it seems to me inappropriate that operators who obtain the highest-class license in the land would be unable to use the second most popular HF mode (and the *most* popular narrow-band mode). Retaining the code requirement for one class of license would certainly be consistent with the intent to provide a licensing program that offers operators an incentive to upgrade their operating skills. There should continue to be an incentive for operators to learn to operate what may be our most robust and most versatile mode. I hope the Commission will consider retaining the code proficiency requirement for the Extra Class license.